

CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society
Of America

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FIG. 59. A desert struggle. The Arizona Giant Cactus has raised the desert tree with a slow, terrific pressure.



CACTUS AND SUCCULENT JOURNAL

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EDITOR'S NOTE

We are publishing a series of photos of questionable plants to see if we can locate their source and identity. In this issue we show the "Black *Gasteria*". We have an interesting series of prolific cacti and other succulents that will follow. In the last issue we showed photos of *Micropuntias* which attracted much comment and brought to light the need of published information on these little known *Opuntias*. We have other surprises to follow.

We are publishing many reprints of articles pertaining to cacti, their habits and environment. In the last issue we featured the *Ocotillo* and in this issue "Ocean Deserts" describe the habitat of this plant and the many cacti found in Lower California, Mexico. The article "Naked Plants" ties in with this series and explains how plants have adapted themselves to the extreme arid conditions. We do not have to feel sorry for cacti struggling along under adverse conditions because they seem to have solved their problems by conserving moisture to such an extent that they are perfectly adapted "happy" plants. By studying and understanding how cacti grow in their native habitats we should improve our cultural methods.

A word to amateurs: Some of the Journals may seem technical but if you will use your reference books such as "Glossary of Succulent Plant Terms," "Cacti and Succulents for the Amateur," plant catalogs, and back issues of the Journal, you will find good illustrations of the plants being discussed. After a while you will have mastered a general understanding of the main groups of cacti and the other succu-

lents and the literature will have a new meaning to you.

OUR HATS OFF TO THE COMMERCIAL MEN

How to become a millionaire in growing cacti is a feature article in the June issue of *Mechanix Illustrated*! Howard Gates is the author and his experiences as a commercial grower are told in an interesting manner. After visiting Gates Cactus Gardens, Johnson Cactus Gardens, and Hummels Exotic Gardens, we surely have no envy for them. Their job is a 24-hour a day endless grind to supply succulents for the trade and for the collector. Unlike a shoe shop where you can go to the shelf and fill orders from boxed merchandise, the cactus business is highly specialized both in growing the plants and handling the mass of detail involved in filling orders. Unlike the Editor, they cannot lock their doors and go fishing, theirs is a 365 day year with their millions of plants requiring constant attention.

FROM ENGLAND

Some years back there was a statement to the effect that the pure yellow forms of cacti, without chlorophyll, do not flower! Two years ago I had a grafted plant of the yellow form of *Rebutia minuscula*, and it DID produce a flower, a marvelous translucent red color, which set seed on its own, there being no other *Rebutias* in flower at the time. From the seed pod there were eight seeds, five of which promptly germinated and produced pure yellow seedlings. They lasted only a month, reaching only a small size before passing out. Another unusual happening here, was the flowering of my precious plant of *Toumeyia papyracantha* in 1955. I have never seen a report of this taking place in England before, though others may have flowered unknown to me. A plant of *Utahia sileri* which I received two years ago, actually grew well last year on its own roots. This year I am hoping against hope to grow a plant of *Navajoa peeblesiana*. I received this last October, and I believe it is the only *Navajoa* ever to have left U.S.A. It is a quaint little fellow, and I really hope that it may settle in here as well as its cousin *Toumeyia* has done.

JOHN G. STATHAM

CACTI AND SUCCULENTS

By E. J. ALEXANDER

Here is an interesting and varied selection that will make good window plants.

Reprinted from The Garden Journal of the New York Botanical Garden.

In heated apartments and homes, it is frequently difficult to get plants to remain in good health. The air is dry and ventilation is poor or drafty. If the air can be kept moist, it is possible to grow any kind of plant that does not require too much sun. Usually, however, the amount of moisture needed by plants is not comfortable for humans, and the resultant conditions in most apartments and homes are those of a desert, especially in the winter. The plants most likely to thrive under such circumstances are cacti and succulents, which are accustomed to desert conditions and manage reasonably well in stale air, provided they are given moisture and ventilation during their growing season. Their angular leaves and geometric forms of growth are in keeping with "modern" furnishings; thus they are very much in place in apartments so decorated, but must, of course, be used in or near windows where the light is strong.

Cacti most satisfactory as house plants are more or less limited in number. Most of them require full sun for at least six hours of the day. Many are grown only for the ornament or design of the plant, as only a few will flower under house or apartment conditions. Many in maturity are very large and are suitable for home growing only when small—these will never reach flowering age without the use of a large greenhouse. However, the following will usually flower if kept in a sunny east or south window and given air during the growing season.

The "rose-plaid cactus," *Gymnocalycium Friedrichii*, is the most readily flowered, even when small; its rose-pink blooms open in the afternoon. The "plaid cactus," *Gymnocalycium Mihanovichii*, is almost equally easy; its flowers are greenish yellow or brownish. Dams' chin cactus, *Gymnocalycium Damsii*, with white flowers, and Quehl's chin cactus, *Gymnocalycium Queblianum*, white with red center, are also good bloomers. Most striking of all is the red-flowered *G. venturianum*.

Notocactus mammulosus is an easy-to-grow cactus with golden-yellow flowers. There are numerous other kinds of *Notocactus*. Three particularly attractive are: *N. Scopa*, the snowball, covered with fine bristly white spines, the central spine of each group brown; and *N. Schumannianus* and *N. Graessneri*, both called



FIG. 60
Notocactus mammulosus, with golden-yellow flowers, is an easy doer

golden ball, and both covered with bristly deep yellow or old gold spines.

Parodia is also a satisfactory group. The "Tom Thumb" cactus, *Parodia aureispina* is the most dependable for flowers. Its flowers are golden-yellow.

Rebutia is another early flowering group; *R. minuscula* with red flowers and *R. violaciflora* with rosy purple ones are the most common.

The "Easterlily" cacti, various species of *Echinopsis*, with quite large flowers which are white or light pink, are reasonably ready bloomers, provided they have good sun.

The "pin-cushion" cacti, *Mammillaria*, of which there are about three hundred different kinds, have some free bloomers among them but the flowers are small, although many are bright-colored. The number one "Mam" for city homes is *M. elongata* in any of its varieties. Its straw-colored flowers are not often produced in the home, but the plant itself is as attractive as a flower, its finger-like branches are covered with radial clusters of pale yellow spines. Other good mammillarias are: *M. elegans*, *M. tetra-cantha*, *M. bombycina*, *M. Habniana*, *M. candida*, *M. fragilis*, *M. multiceps*, *M. decipiens*, *M. bocasana*. The first five are red-flowered; the

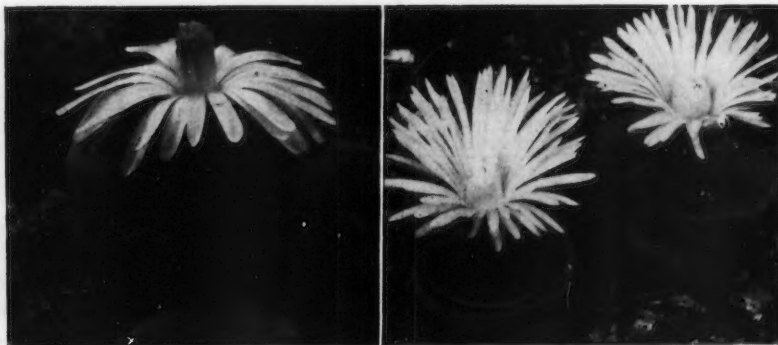


FIG. 61

Lithops bella, right, and *L. optica*, left, are among the most perfect of the stone-mimickers

last four have creamy or straw-colored flowers.

The prickly-pears and chollas, both of the genus *Opuntia*, are not recommended for home culture, as they are dangerous to handle and require too much sun. One of them, however, is perfectly safe and also highly ornamental. This is the white-spined form of *Opuntia microdasys*, called *Opuntia microdasys* var. *albata*, whose spines, while they stick to the fingers readily, may be brushed off by just rubbing the hands together; and the spines have no ill effects. A word of warning, though, about *O. microdasys* and *O. rufida*, often sold under the name of "bunny-ears." They are very dangerous plants to handle, as the spines come off easily, stick in the fingers and hands, and cause painful irritations and sores. Do not grow them.

Of other succulents, the best for home conditions are species of *Gasteria* and *Haworthia*. These plants are best grown in east windows, as their leaves turn yellowish in the sun of southern or western exposures. They are very hardy plants and look their best during the winter months, which are their growing time. They grow best in soil two-thirds loam and one-third sand, with some leafmold, and require watering every third day from September to May, and

once every two weeks in June, July, and August, as that is their rest period. Since the gasterias are all very much alike in form and flower, any of them that do not grow too large are suitable as house plants.

Haworthias, on the other hand, while all of small size, have greater variety of form and markings. There are kinds which have dark green leaves with white tubercles; these are the most popular, and they have two forms of growth, one a dense rosette, the other cylindrical. Of the rosette forms, the best are *Haworthia fasciata*, *H. attenuata*, and *H. margaritifera*; of the cylindrical forms *H. Chalwinii* and *H. Reinwardtii*. There are also kinds with pale green leaves, some of which have translucent windows on the upper parts of the leaves. Of these, the best are *H. cymbiformis*, *H. piliifera*, and *H. setata*. A neat little cluster-forming one is variously sold under many different names, the most common being *H. atrovirens* and *H. translucens*.

Of the hundreds of species of *Aloe*, only a few are sufficiently small for use as house plants. The finest of all is the "partridge-breast," *Aloe variegata*. It is not too easily kept in good health, but has a reasonably long life if watered only sparingly. Somewhat more easily handled

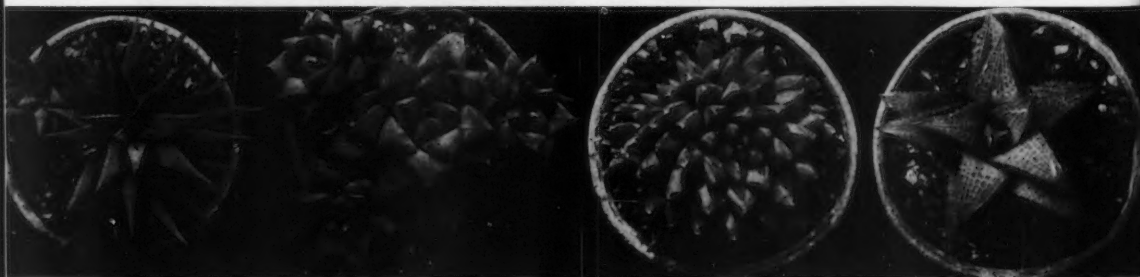


FIG. 62

Among the best succulents for an east window of an apartment or home are these haworthias



FIG. 63

Cheiridopsis rostrata has attractive yellow flowers

are *Aloe humilis* and *A. brevifolia*, both with blue-green, spiny-tubercled leaves. Two larger growing ones are the bushy *A. arborescens* and the half-climbing *A. ciliaris*. All of these plants have red or orange flowers in heavy spikes.

A very large group of plants in the Stonecrop Family is also fairly popular as house plants. The most commonly grown is *Crassula argentea*, under the name of jade plant, Mexican rubber-plant, or Japanese rubber-plant. It is a native of South Africa and is no relation to any kind of rubber-plant. There are some five hundred other kinds of *Crassula*, covering the entire range of plant forms, all of them succulent, and any of them suitable for house plants where there is good light. Two of the more popular ones are the red-flowered *C. falcata*, whose bluish gray, sickle-like leaves spread into a flattened fan-like growth, and *C. perforata* with paired leaves completely encircling the stem, and with a hanging form of growth, making it suitable for window shelves or hanging baskets. *C. tetragona*, which looks like a small pine tree, is also popular, as is *C. lycopodioides* with its bushy moss-like growth.

A few kinds of *Cotyledon* are grown—these have large, bluish, paired leaves and bear, at the top of a long stem, pendant, tubular, coral-colored flowers.

All of the preceding plants of the Stonecrop Family are South African, but there are some American members of this Family. Of these the most attractive are the kinds of *Echeveria* with rosette forms of growth, leaves green, grayish,

or tinted with metallic shades of purple, lavender, and reddish. Their flowers are bell-shaped, on long arching sprays, and are usually red or orange, with yellow tips. A few have a bushy form of growth with upright spikes of flowers.

The Mexican kinds of *Sedum* are also used—these have bushy forms of growth much like the crassulas, but the leaves are not paired.

A third group comes from the Canary Islands and belongs to the genus *Aeonium*. They are big saucer-like rosettes raised on thick stems.

Whereas crassulas grow reasonably well in poor light, none of the other members of the Stonecrop Family may be expected to grow well without at least six or eight hours of sunlight. *Echeverias*, sedums, cotyledons, and aeoniums are not satisfactory house plants without the required sun.

In a sunny window, south or southeastern exposure, it will be possible to grow the stone-mimicry and windowed plants. These plants from South Africa are not difficult under the proper conditions, and being small, they may be grown several in a pot. They must have rather sandy soil, some lime, one hundred percent drainage, and no more than token watering when they are dormant, or they will rot overnight. They have two growing periods, in the spring and in the autumn. The flowering period is usually autumn, although there are a few which flower in the spring. The main rest periods are June, July, and August, and November to March. During the winter period, it is advisable not to water them at all; a little water twice



Gymnocalycium are easy doers and good bloomers

a week is safe during the hot summer period.

Several kinds are offered by growers, and all are attractive with yellow or white flowers as large as or sometimes larger than the plants. These flowers open for several hours every afternoon for about a week; a few are night-blooming. The genera most commonly grown are *Faucaria*, *Pleiospilos*, *Cheiridopsis*, and *Herreroa*. The *faucarias* have silver-like leaves with backward-pointing, fringe-like teeth; *pleiospilos* have a rounded pair of leaves, sometimes appearing like a dark green pebble split down the center, at other times two oblong leaves separated by a wide V. *Cheiridopsis* are green or blue-white in color, with two small outer leaves and two long, upright, finger-like leaves pressed tightly together; *herreroas* are tiny shrubs with several leaves like moose-horns.

If one wishes to try a hand at something a bit more difficult, specialty dealers can supply many kinds of *Lithops*. These plants are the most perfect of the stone-mimickers, whose two leaves are flat-topped and united into a single body with a cleft on top. They are, however, very intolerant of overwatering and must be kept in full sun. In fact, *lithops* and *pleiospilos* should have only their roots in soil, and the lower part of the plant body in pure sand or gravel.

Something should be said here about the plastic pots, in which so many small plants of cacti and succulents are being sold at present. Firstly, plastic pots are satisfactory, provided they have holes for drainage and are of adequate size for the roots of plants. To take care of the non-porous character, simply give less water. The tiny pots, an inch and a half or less in diameter, are also all right for seedlings or small cuttings. The plants can grow in these small pots only about six months to a year and then, unless moved into larger pots, they will die either from starvation or rot. The pots are too small to

hold enough soil for food, and constant watering, after the pot is filled with roots, causes rot. If one wishes only a temporary ornament, well and good; but if a healthy, growing plant is wanted, the plants should be removed from the midget pots and placed in proper receptacles.

Cacti and succulents, as are all plants, are subject to damage and even death by insect pests and fungus diseases. Plants attacked by fungus or rot rarely, if ever, survive. It is best to discard them under house or apartment conditions. There are three kinds of insect pests, which are easily controlled if they are treated as soon as they appear. Red spider (a mite) is destroyed by the use of "Aramite." Mealy bug (an aphid which surrounds itself with a white cottony mass) and scale insects may be destroyed by touching the insects with rubbing alcohol—applied with a small water-color paint-brush or a pipe-cleaner. If the infestation is bad, it is best to use "Malathion," into the recommended solution of which a small amount of detergent such as "Fab" or "Tide" has been added. Do not use soap with "Malathion" or "Aramite." Be sure to follow the directions on the containers, and wash hands after using. "Malathion" should not be used on plants of the Stonecrop Family, such as *Sedum*, *Echeveria*, *Crassula*, *Cotyledon*, and *Aeonium*; for these it is necessary to use "Blackleaf 40," as per its directions, to which add some "Fab" or "Tide."



FIG. 65

Parodia aureispina may be depended on to flower

The only really tricky problems about cacti and succulents are watering and soil. The first thing to learn about them is that, while they came originally from arid and semi-arid regions, they nevertheless need water in their growing season, as do other plants. Also, desert soils are very rich in mineral content, because they have not been drained of their plant foods by rain which leaches the soil. This means that in the growing season, cacti and succulents must be

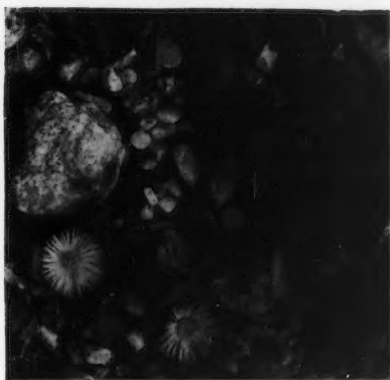


FIG. 66
Pleiospilos Bolusii, one of the stone-mimicry plants, may be grown in a sunny window

watered and fed with some type of plant nutrients. It also means that they should be planted in fairly rich, but well-drained soil. The best general mixture, therefore, is good garden loam and coarse sand, mixed half and half. To this should be added a handful of agricultural lime and a handful of well-rotted leafmold to each peck of soil mixture. A second handful of the lime should be added, if the plants to be potted have white spines, white bodies, whitened leaves, or white incrustations. The mixture should be two-thirds sand, if the plants to be potted are stone mimicry or windowed plants.

Potting should be done with slightly moist soil. The pot should be the regular earthenware type with a drainage hole in the bottom. The hole should be covered with a flat fragment of pot. In planting, have the roots dry and spread them as well as possible, covering carefully with soil. Do not water for two weeks afterwards, no matter how dry they appear. Then give a light watering twice a week for two more weeks. After that water thoroughly twice a week during the growing season. Do not water on cloudy or rainy days. In winter or when the plants are dormant, water once every two weeks.

Fancy glazed bowls or painted pots without drainage holes should not be used if one desires healthy plants—lack of drainage and root aeration will eventually rot the roots and the plant will also rot at the soil line.

Since soil confined in pots becomes exhausted of its plant foods, plants should be repotted every third year in completely new soil.

Well-established plants will benefit by the use of artificial plant foods. For this purpose, "TraceL," "Miracle-gro," "Rapid-gro" or "Hyponex" are all satisfactory, but follow carefully the directions on the packages—overfeeding frequently will kill plants.



FIG. 67
Rebutia minuscula bears its red flowers freely

These, then, are the major precepts in the indoor culture of cactus and succulent plants. One is not expected to follow them to the letter, since conditions vary in different homes and apartments, and the same plant does not always respond to the same treatment if surroundings vary. There are times when the only way to handle a plant is by experiment to learn which is the called-for treatment. One may have to experiment with different soil mixtures, but remember the soil must always be well-drained. The plant's food is mostly obtained by the roots in liquid solution; therefore, some watering is absolutely necessary.

The one thing never to forget is that plants are living things, and must be given food, light, and air—prolonged lack of any one of these is fatal.

CACTUS AND SUCCULENT JOURNAL

The following complete volumes of the Cactus and Succulent Journal of the Cactus and Succulent Society of America are now available. Some of the early numbers are reprints but are complete (the inserts have been removed) with indexes. For bound copies add \$2.50 each volume. Add 10¢ per volume postage in USA. Volumes delivered in California please add 4% sales tax. For a consecutive run of 10 or more volumes a 10% discount is allowed.

VOLUME	PRICE	VOLUME	PRICE
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III	10.00	XVII	6.00
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XII	8.00	XXVI	6.00
XIII	3.00	XXVII	5.00
XIV	3.00		

The next list of Journals will include broken volumes and single issues. Now is the time to complete your sets and for those who wish, budget terms may be arranged.



FIG. 68

Pereskia gigantea showing habit of the plant

GENUS PERESKIA (Tribe 1. *Pereskieae*) OF THE FAMILY CACTACEAE

WM. HERTRICH

From *Lasca Leaves*

PRIMARILY FOUND in the more tropical sections of the American Continent, this group of plants is roughly described as including leafy shrubs or trees, though a few are clambering vines. The more or less woody type of plants among them have straight spines in clusters in the axils of the leaves, occurring occasionally in pairs; rarely are they entirely devoid of spines. The leaves are either flat or channeled, ranging in shape from orbicular to a more elongate form, from about three inches long by one to one and a half or more inches wide. The woody type of *Pereskia* is deciduous.

In the Huntington Gardens *Pereskia gigantea* and *P. pereskia*, which is a climbing form, are practically evergreen during milder winters, while other species are barren of leaves. Flowers are produced which are either single or in umbels; fruiting of certain of the species is very prolific. In locations free of heavy frost, *P. gigantea* forms a large orna-

mental shrub, sometimes of small tree proportion under favorable conditions. The accompanying photograph shows a specimen which has been in the gardens for about fourteen years. It froze nearly to the ground in 1937 and 1949 when heavy frosts occurred; but it has now recovered and is approximately 8 feet tall with 10 canes of 2-inch diameter.

Found wild only in the tropics, this tribe enjoys wide geographic distribution, various species being native to Mexico, the West Indies, Central America, and South America. The type species was first introduced into Europe from the West Indies, during the latter part of the 16th century. Adoption of the nomenclature honored Nicholas Claude Fabry de Peiresc (1580-1637), "a member of Parliament from Aix, in Provence, a very learned man and devoted to Botany." The spelling of the generic name has suffered a number of deviations, appearing in literature variously as *Peirescia*, *Peireskia*, *Perescia* and



FIG. 69
Flower and fruit of *Pereskia gigantea*

Pereskia. Several species of *Pereskia* are used as understock for grafting forms of *Zygocactus*, *Epiphyllum* and other cacti adaptable for this purpose. The familiar *Opuntia* is closely related: in fact, some species of *Opuntia* were first referred botanically to the *Pereskieae*.

Flower and fruit detail may be studied in the photograph in these columns; it shows clearly proliferous tendencies in the nature of the fruiting, and also the curious habit of branching which elementally follows the pattern of reef-coral growth. Of the types grown in the Huntington Gardens, *P. pereskia* was another to suffer severely in January 1937; it is a form

which at first appears erect but ultimately develops long clambering canes. This type grows natively on the north and east coasts of South America, in the West Indies, Florida, and in Mexico; it is grown largely for its fruits in the West Indies, and for its leaves in Brazil where it is used as a potherb. In La Plata, it is used as hedge material, though never near habitations because of its objectionable and strong odor. Several folk names are commonly used for this plant, Blade Apple, Barbados Gooseberry, West Indian Gooseberry, Lemon Vine.

REFERENCE: *The Cactaceae*, Britton & Rose, Carnegie Institution of Washington. 1919.

New Bolivian Cacti - Part 4

By Prof. Martín Cárdenas

Concluded from Vol. XXVIII, No. 3, pg. 71

Echinopsis torrecillasensis Cárdenas, sp. nov.

Simplex. Radix incrassatus, napiformibus, 7-8 cm. long. Caulis complanatus 1-2 cm. altis, herba viridis. Costis 16, acutis, crenatis, 5 mm. altis, 7-8 mm. latis. Areolis, 6-8 mm. distantes, circularis, 3 mm. diam., cinereo tomentosus. Aculeis radiales 6-7, 5-10 mm. long.; aculei centrali 10 mm. long. Omnes aculeis curvatis, compressus, acicularis, cinereis. Flores ex margine caulis, anguste infundibuliformis, 8 cm. long. Ovario globoso 5 mm. diam.; viridis, squamis acutis, diluto viridis, pilis albis praedito. Tubus 5 cm. long., temperate viridis, 2 mm. long. squamis viridis, apice albidis, pilis albis praeditus. Phylla perigoni exteriora lanceolata, intus rubis, extus viridis, 1.5 cm. long.; phylla interiora, rubi rosea vel salmonea, lanceolata, 2.5 cm. long. Stamina stylo superans; filamenta purpurea, antherae flavae. Stylo diluto viridis, 4 cm. long., 7 lacinis stigmaticis smaragdo viridis coronato.

Fructo elliptico 12-15 mm. long. atro purpureo, squamis temperato magentibus, 1 mm. long. acutis, pilis albis praedito. Semina pauca 1.2 mm. long., nigra minute punctulata.

Patria: Bolivia, provinci Florida, departmēti Santa Cruz, prope Torrecillas (Comarapa), 3,500 m.

Simple with a large turnip like 7-8 cm. long root. Stems flattened, 1-2 cm. high, 4-5 cm. broad, fresh green. Ribs 16, hatched, crenate, 5

mm. high, 7-8 mm. broad. Areoles 6-8 mm. apart, circular, 3 mm. diam., gray felted. Radial spines 6-7, 5-10 mm. long; central spine, one, 10 mm. long. All spines curved and appressed, acicular, gray. Flowers from the borders of the



FIG. 70
Echinopsis torrecillasensis sp. nov. x1.0

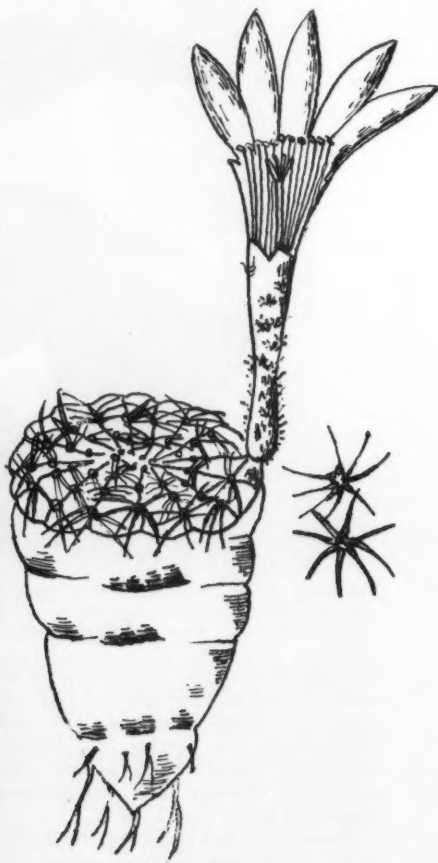


FIG. 72
Echinopsis torrecillasensis sp. nov. x1.0



FIG. 71
Echinopsis torrecillasensis sp. nov., 1 fruit x1.0;
2 seeds x5.0

stem, narrowly funnelform, 8 cm. long. Ovary globose 5 mm. diam, green with acute, light green scales which bear white hairs. Tube 5 cm. long, light green, provided with 2 mm. long, green, whitish tipped scales bearing white hairs. Outer perianth segments, lanceolate, reddish inside, greenish outside, 1.5 cm. long; inner segments lanceolate, red pink or salmon colored, 2.5 cm. long. Stamens surpassing the style; filaments purple, anthers yellow. Style light green, 4 cm. long. Stigma rays 7, emerald green.

Fruit elliptic, almost dry 12-15 mm. long, dark purple with light magenta 1 mm. long acute scales which bear white hairs. Seeds few, no more than 20 in each fruit, 1.2 mm. long finely punctulate.

Bolivia. Province of Florida. Department of Santa Cruz. Torrecillas, near Comarapa, 3,500 m. October 1947. M. Cárdenas, No. 5060 (Type) in Herbarium Cardenasianum.

Obs. This little and showy cactus, grows deeply into the sand among grasses and being noticeable only when it is blooming. It is very similar in its habit to *Echinopsis polyancistra* Bckbg. from Northern Argentina, but differs by its enormous turnip like root like that of *Neowerdermannia* and by its colored flowers.

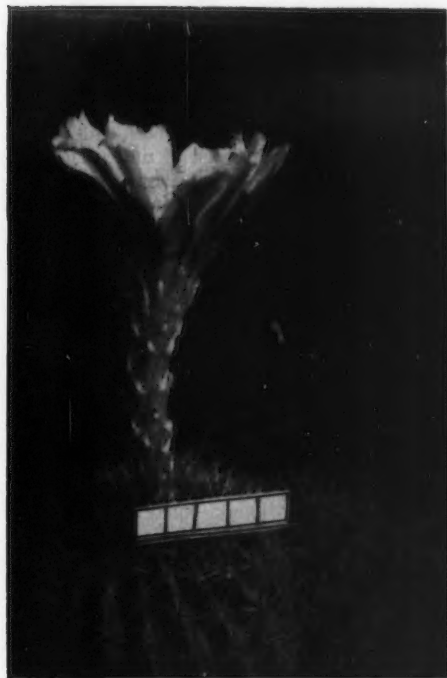


FIG. 73
Echinopsis herbasii sp. nov.

Echinopsis herbasii Cárdenas, sp. nov.

Ceaspitatus, globosus, depressus, 4-6 cm. altus, 7-10 cm. crassus, diluto viridis. Costis 20-23, acutis, crenatis, 8 mm. altis, 12 mm. latis. Areolis 1 cm. remotis, ellipticis, prominentibus, 5 mm. diam., cinereo tomentosis. Aculeis 20-25, acicularis, tenuis, cinereis, apice bruneo, 1-2 cm. long., divaricatis a basim incrassatis. Flores ex umbilicus vicinis, infundibuliformis, 14 cm. long. Ovario globoso, 1.5 cm. diam., diluto viridis, squamis 4 mm. long., acutis, flavidulus, pilis albis praedito. Tubus 5.5 cm. long., striatus, 12 mm. crassus supra ovarium, temperato viridis, squamis 5-10 mm. long., flavidulus, acutis, paucis pilis albis praeditus. Phylla perigoni exteriora lanceolata 2-3 cm. long., viridia, apice brunea; phylla intermedia elliptica 3.5 cm. long., mucronata, inferne albida, superne purpurea; phylla interiora lato elliptica 4 cm. long. alba. Stamina duplo seriali inserta; inferiora 6 cm. long., superiora 1.5 cm. long.; filamenta albida, antherae atro flavae. Stylo 10.5 cm. long., inferne viridis, superne flavidis, stamina superans, 13 laevis stigmaticis, diluto flavis coronato.

Patria: Bolivia, provinci Cinti, departamenti Chuquisca, in itinere Pampa Larga-Escayachi, 2,000 m.

Obs. Species mei dicipulus agronomus Remberto Herbas dicata.

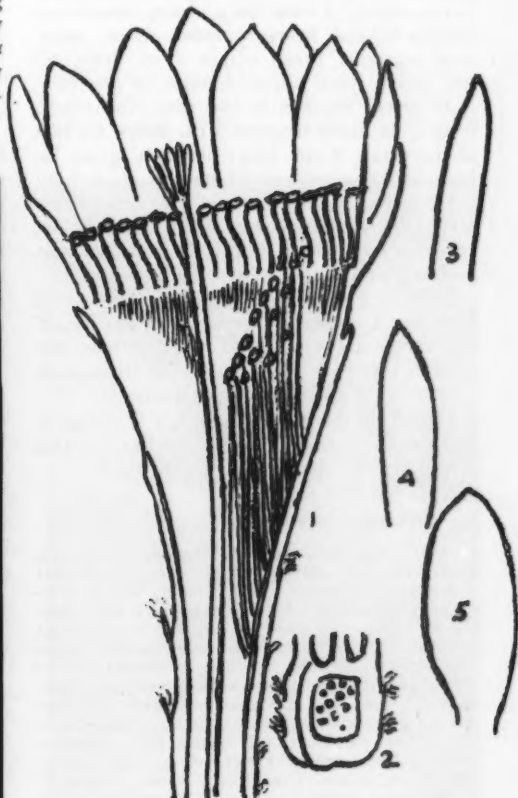


FIG. 74
Echinopsis herbasii sp. nov., 1-2 flower dissection; 3, 4, and 5 outer, middle, and inner perianth segments; all x1.0

Caespitose, globose, flattened 4-6 cm. high, 7-10 cm. broad, depressed at the top, light green. Ribs 20-23, acute, crenate, about 8 mm. high, 12 mm. broad at the base. Areoles about 1 cm. apart, elliptic, prominent, 5 mm. diameter, gray felted. Spines not differentiated into radials and centrals, 20-25, very thin, acicular, gray, brown tipped; shortest ones, 1 cm. long, medium sized ones, 14 mm. long and longest ones, 20-24 mm. All spines spreading, swollen at their base. Top areoles with dense cream felt and few or no spines. Flowers only one or two from near the apex depression, short funnel-form, 14 cm. long, 7 cm. limb, night blooming. Ovary globose 1.5 cm. long, light green, with 4 mm. long, acute yellowish scales bearing white hairs. Tube striate 5.5 cm. long, 12 mm. broad above ovary, lettuce green with 5-10 mm. long, yellowish acute scales which bear very few white hairs; upper tube scales, outwards curved. Outer perianth segments lanceolate, 2-3 cm. long, 4 mm. broad, green, brown tipped; middle segments elliptic, 3.5 cm. long, 6 mm. broad, mucronate, whitish below, purplish above; innermost segments, broad elliptic 4 cm. long, 1.5 cm. broad, pure white. Interior of the tube, light green. Stamens in two rows; lower ones from 2 cm. above ovary to 3 cm. below the base of the petals, 6 cm. long; filaments, green below, whitish above; upper stamens are 1.5 cm. long, filaments white; all anthers, dark yellow. Style 10.5 cm. long, 2 mm. thick, green below, yellow above, much longer than the stamens. Stigma rays 13, light yellow, 6-8 mm. long.

Bolivia. Province of Cinti. Department of Chuquisaca. Between Pampa Larga and Escaya-che, 2,000 m. March 1952. M. Cárdenas, No. 5061 (Type) in Herbarium Cardenasianum. Cotype in the U. S. National Herbarium.

Obs. This species of *Echinopsis* is characterized by its proliferous habit and its very thin spines.

Opuntia orurensis Cárdenas, sp. nov.

Platypuntia, gregaria, pulviniformia vel repens. Radix superficilis. Pulvinj 10 cm. altis, 50 cm. latis, dichotomici in articulis divis. Articulis inferne ellipsoides vel cylindricis, 3-4 cm. long, 10-18 mm. diam., superne articulis obovatis, fere curvatis, complanatis, herba viridis. Areolis 7-10 mm. separatis in 4-5 spiraler serialis dispositis, circularis, prominentibus, 1-3 mm. diam., cinereo vel atro brunnei tomentosis, pulvinulo 2-4 mm. long, flavidulo vel bruno, praeditis. Aculeis 4-8, acicularis, 5-20 mm. long., superne direxit, albidis vel purpureis, vel brunescens, adhaerans. Alabaster lato conicus. Flores 1-4 ex apice superne articulorum, rotacei, 4 cm. long. Ovario obconico 12-15 mm. long., tuberculato, viridis, 3 spiraler serialis areolis crema tomentosis, 4-8 aculeis, tenuis, atro purpureis, pulvinulo denso, flavo vel purpureo praeditis. Squamis umbilicorum 5 mm. long. triangularibus purpureis ex margine insertis. Phylla perigoni exteriora spatulata, flava apice purpurea; interiora lata

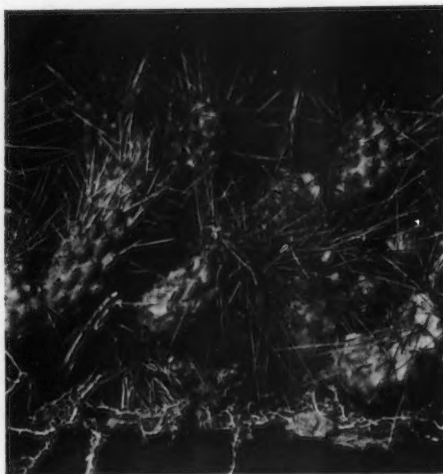


FIG. 75

Opuntia orurensis sp. nov. x0.35

spathulata, sulphurea flava, apice aurantiaca. Stamina 1 cm. long.; filamenta alba, antherae flavae. Stylo 15 mm. long, 2 mm. crasso, albo, 6 lacinis stigmaticis, 2 mm. long., smaragdo viridis, crassis coronato. Fructo obconico 18-20 mm. long., magenta-purpureo.

Patria: Bolivia, provinci Cercado, departmēti Oruro, 3,700 m.

Caespitose, creeping, dichotomously branching, forming groups of 10 cm. height and 50 cm. diameter. Joints ellipsoid, somewhat curved; lower ones, rather cylindric, upper ones flattened, 3-4 cm. long, 10-18 mm. broad, fresh green; lower joints tapering at both ends; upper ones rounded at the apex and tuberculate. All joints detachable. Areoles in 4-5 spiral series, 7-10 mm. apart; lower joints areoles, circular, prominent, 3 mm. in diameter, dark brown felted; upper joints areoles 1-2 mm. diameter, light gray felted. Spines not differentiated into radials and centrals; lower areoles with 6-8 acicular spines some white, reddish tipped and some brown reddish and numerous 2-4 mm. long yellow or brown glochids; upper areoles, with 4-8 acicular spines purple brownish; all spines upward erected with sticking tips; shortest spines about 5 mm. long, medium sized ones, 10 mm. long; longest ones, 18-22 mm. Flower buds, broadly conic. Flowers 1-4 from the border of the upper joints, rotate, 4 cm. long. Ovary obconic, 10-15 mm. long with a 10-14 mm. diameter umbilicus, tuberculate, fresh green provided with 3 spiral series of areoles, 1-1.5 mm. diameter bearing 4-8 thin dark purple spines, several yellow and dark purple glochids and cream felt. Upper ovary areoles, with 2-4 mm. acute, purple scales which are triangular and 5 mm. long at the umbilicus border. Outer perianth segments spatulate,

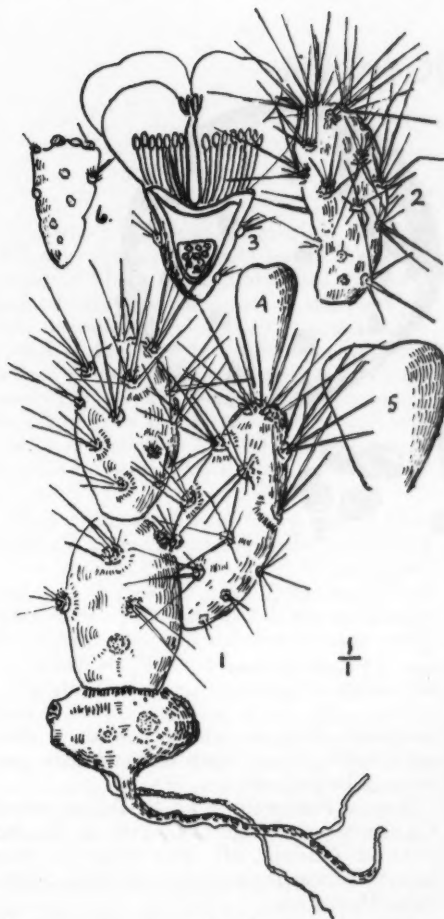


FIG. 76

Opuntia orurensis sp. nov., 1 lower joint; 2 upper joints; 3 flower; 4-5 outer and inner perianth segments; 6 fruit; all $\times 1.0$

15 x 7 mm., yellow, purplish tipped; inner ones broadly spatulate 20 x 17 mm., sulphur yellow, orange tipped. Stamens 1 cm. long; filaments white yellowish, anthers sulphur yellow. Style 15 mm. long, 2 mm. thick, white. Stigma rays 6, thick, 2 mm. long, emerald green. Fruit obconic 18-20 mm. long, purple, mostly sterile.

Bolivia. Province of Cercado. Department of Oruro, 3,700 m. November 1951. M. Cárdenas, No. 5062 (Type) in Herbarium Cardenasianum. Cotype in the U. S. National Herbarium.

Obs. This species, reminds by its creeping habit, *Opuntia soebsrensi* Br. & R. which grows about the same places, but differs from it by its quite cylindrical and thicker joints and its stronger spines. The fruit in the former species, is usually seeded.

Opuntia arcei Cárdenas, sp. nov.

Platyopuntia, arborea, ramosa, 1.50-2 m. alta. Trunco 60-80 cm. altus, 20-25 cm. crassus, bruneo viridis, ramosus. Articuli oblongo rhomboidalis 36-42 x 15-25 cm. Areolis 3-4 cm. separatis, circularis 3 mm. diam., cinereo tomentosis, in 8 spiralliter serialis dispositis. Aculeis 4-7, tenue subulatis, albis, 5-30 mm. long. Alabaster conicus, viridis. Flores 10-12 ex apice superne articularum, rotacei, 6 cm. long. Ovario seriaeformis, 3.5 cm. long., 3 cm. diam., atro viridis, tuberculato, 5 spiralliter serialis areolis 2 mm. diam., brunei tomentosis, 2 mm. long. numerosis atro flavis pulvinuli praedito. Superne ovario areolis, squamis acutis, viridis, aculeis tenuis pulvinuliformibus instructo. Phylla perigoni exteriora deltoidea vel elliptica, abrupte acuta, 8-12 mm. long.; phylla interiora spatulata 25-30 x 12-14 mm., aureo flava. Stamina numerosa 15 mm. long., filamenta albidia; antherae diluto flavae. Stylo 28 mm. long., albo, crasso, 9 lacinis stigmaticis, 4 mm. long., crassus, temperato viridis coronato. Fructo globoso vel dolioliformibus 4.5 cm. diam., viridis vel paululo rubescente, areolis 5 serialis, 3 mm. diam. pulvinuli denso, temperato brunei praedito. Umbilicus 2.5-3 cm. diam. vix profundus. Pulpa viridia, succosa. Semina tortuosa, 5-9 mm. long., atro cinerea, arilo flavidulo.

Patria: Bolivia, provinci Cercado, departamenti Cochabamba, prope La Angostura, 2,560 m.

Obs. Species, mei discipulus, agronomus Lucio Arce dicata.

Platyopuntia, tree like, branching from a short trunk, 1.50-2 m. tall. Trunk green brownish, cracked, spiny, 60-80 cm. height, 20-25 cm. in



FIG. 77

Opuntia arcei sp. nov. $\times 0.1$

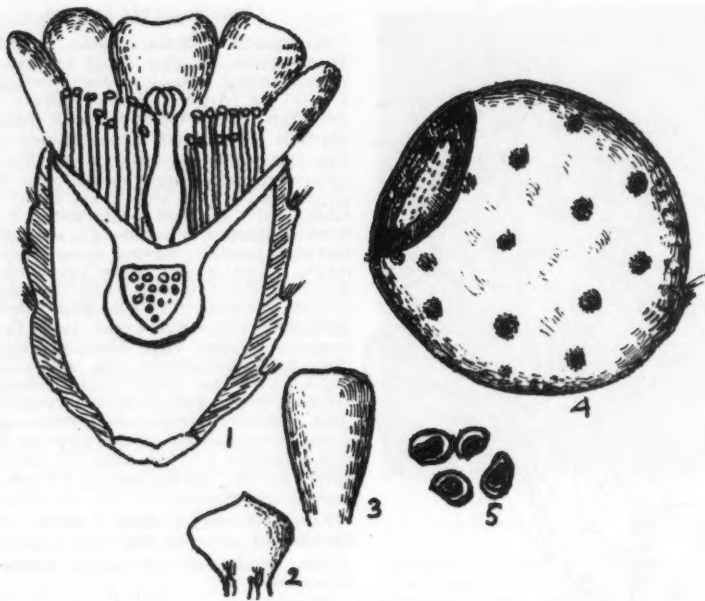


FIG. 78
Opuntia arcei sp. nov., 1 flower; 2-3 outer and inner
perianth segments; 4 fruit; 5 seeds; all x1.0

diameter. Joints, oblong-rhomboidal, 36-42 x 15-25 cm., 1-1.5 cm. thick. Areoles 3-4 cm. apart, circular, 3 mm. diameter, gray felted, in 8 spiral series. Spines 4-7, thin subulate, white; shortest ones 5 mm. long, medium sized, 2 cm. long and longest ones 3 cm. Flower buds, conic, green. Flowers about 10-12 from the upper borders of the joints, rotate, about 6 cm. long, 4 cm. limb. Ovary barrel shaped 3.5 cm. long, 3 cm. broad, dark green, tuberculate with 5 spiral series of areoles 2 mm. diameter, circular, brown felted and bearing dense dark yellow glochids. Upper areoles bordering the umbilicus, with green, purple tipped acute scales and 5-7 mm. long spine like glochids. Outer perianth segments, deltoid or elliptic, abruptly acute at apex, green, purple tipped 8-12 mm. long. Inner segments spathulate 25-30 x 12-14 mm., golden yellow. Stamens numerous, 15 mm. long, from near the base of style to the base of the petals. Style 28 mm. long, white thick; stigma rays 9, sticking, thick, 4 mm. long, light green. Fruit globose or barrel shaped, 4.5 cm. diameter, green or sometimes with a light red flush, bearing 5 spiral series of areoles which are 3 mm. in diameter and provided with dense brown glochids. Upper

umbilicus, 2.5-3 cm. diameter, shallow. Pulp juicy, edible, green. Seeds tortuous, dark gray with a yellowish arile.

Bolivia. Province of Cercado. Department of Cochabamba. La Angostura, 2,560 m. October 1955. M. Cárdenas, No. 5063 (Type) in Herbarium Cardenasianum, cotype in the U. S. National Herbarium.

Obs. This species belongs to the Series 21. Streptacanthae of Britton and Rose System and reminds the Argentinian species growing in Bolivia also, *Opuntia cordobensis* Spegazzini, but differs by its barrel shaped and green fruits. Most of the species included in this series and named vernacularly "tunas", grow from Mexico to Argentine and are partially cultivated for its edible fruits which however are not as good as those of *Opuntia ficus indica* (Linnaeus) Miller. We have found this species in both conditions as a wild plant and as a cultivated succulent. It has not so far, any known native name, except "tapa culo" which is Spanish. There must be some of these semicultivated *Opuntias* still undescribed in South America.

Cochabamba-Bolivia, October 1955.

M. CARDENAS

FEED YOUR CACTI

By ARTHUR BLOCHER

Amboy, Illinois

From "Cactus Digest"

We, who live here in the so-called Midwest, (and to pin-point it further) live in the northern part of Illinois are usually blessed with sufficient rainfall. It is true, some of the years are what are called "dry years" but normally our rainfall is sufficient for our pastures, lawns, gardens, crops, etc. At some times and in some seasons our rainfalls border on the "tropical." For example, in October of 1954 we had over 7 inches of rainfall in 24 good hours. Now how does this excessive rainfall effect my cactus collection?

Many times after these heavy rains I have found the pots, various containers in which I pot my cactus are full of water. In the larger-sized pots this would mean from one to two inches of water standing as I do not completely fill the containers with soil, but do allow room for feeding and watering.

Not all of my cactus collection is placed outdoors in their various beds in the spring, as due to our heavy precipitation many would rot. I can normally place the following kinds or species outdoors: *Opuntias*, *Cereus*, *Ferocactus*, *Echinopsis*, *Lobivias*, *Astrophytums*, some *Mammillarias*, some *Echinocereus*, *Agaves*, *Yuccas*, etc.

I have observed though that after a couple of years the plants which are "summered" outside usually stand still, refuse to grow, bloom and seem to be in a very dormant stage. Neither were the plants pot-bound. So what was the real trouble? Others of course that were pot bound and then repotted into a larger pot soon took on a "new lease on life." But with a collection the size of mine I could not repot a couple thousand plants every other year. And again, many could not stand the continual repotting and my losses would mount. While the repotting revived many plants, what about the others? Many of my *Opuntias* were getting so large, it took two to carry them outdoors in the spring and in the fall they were larger. A 14-inch pot with a 6-ft. plant and a 7-ft. plant like *Opuntia tomentosa* are as large as two can move or handle. Larger pots are or were out of the question. I was loathe to trim my large *Opuntias*, although that finally came to pass.

Here are a couple of examples, the first one is of a 5-ft. *Opuntia spinosior* which bloomed

for two years, then quit blooming and quit growing, and stood still for a couple of years. The second example is of a 6-ft. *Cereus peruvianus monstrosus* which followed the same pattern. What was the cause of this?

We all know that with the heavy crops, bumper crops raised here helps to deplete our soils. We also know that the heavy rains help to leach the minerals and organic contents out of our soils. Our erosion problems are of a minor nature here so we could not blame erosion. Isn't it possible that the heavy precipitation that leaches out the farmers' and gardeners' soil would also leach out the soils in my pots of cactus and more so because of its more exposed nature. Would it be possible to replenish these minerals without a continual repotting program which was not entirely satisfactory? For several years I carried on a series of experiments and the results have exceeded my fondest expectations. In fact these results were so successful I have been able to raise many plants not only outdoors but many others I have been unable to even raise in my greenhouse at any time. One example, *Opuntia basilaris* will not tolerate being outdoors, evidently the humidity is too high, in the greenhouse it soon developed black spots, rotted and died. Now I can and have successfully raised *Opuntia basilaris* and its subspecies and they are beginning to bloom for me. Now is the ideal time to purchase the materials I use if you so wish, and get ready for this spring and summer.

This is the mixture I used and I know it works as I have used it for years. To some this mixture may seem too rich, to others it may seem like it is out of balance, but I personally feel that each ingredient does contribute to the ultimate and helps. I know that plants that were not growing, or in a sort of a dormant state, and not blooming have revived. The two plants mentioned along with many others have taken on a "new lease on life." I use two trowels full of sheep manure, one trowel full of bone meal, one trowel full of phosphate, one trowel full of Fertilife. This last named is an organic compound impregnated with bacteria and is quick-acting. The size of the trowel used does not matter just so the same size is used for all four ingredients.

The amount stirred into the topsoil in each

pot is determined by two factors. First, the size of the pot, and second, the type of soil used. For the first example I will take a 10-inch full sized pot and will stir an ordinary sized trowel full into the topsoil. A real large trowel used would undoubtedly hold too much. A small sized trowel too little. The trowel I use holds about 3 tablespoonsful. For a five-inch pot I would use about $\frac{1}{2}$ of a trowel full, for a 14-inch pot about $1\frac{1}{2}$ trowels full. For the second reason, if the soil is very sandy, naturally the ingredients will leach out faster so I use about one-third more.

What about the results? Has this mixture hurt any of my plants? I answer to the first question, the results are short of miraculous, as it has revived all sick or partly dormant plants. For more proof, I have a very fine crested plant of *Opuntia macrocentra* from New Mexico. The pads were of a poor color, one year it made no new growth, did not bloom, and even started to develop some black spots on the pads, which finally dried up. I stirred into the top soil one and one-third trowels full of the mixture. The size of this pot was 10 inches and full sized. After a couple of rains the pads started to fill out, becoming more plump, the color returned and the dried spots fell off. The next year it developed eleven new pads and bloomed. The new growth was healthy, thick, colorful and the spines gorgeous.

I know many collectors do not care much for Opuntias and have only a few in their collections, but I wish you could see my collection of same. I have over 110 different kinds and some that I have found impossible to raise, I now find possible after using the stated mixture. I wish you could see my collection of *Opuntia basilaris* and its varieties. This has been one of the Opuntias almost impossible to raise, but now I have many beautiful plants and they have started in the past couple years to bloom for me.

It is evident to me that the mixture supplies all the necessary minerals except lime, also food for the plants. It does save a world of repotting especially when one has to carry out a couple thousand plants each spring and carry them back indoors in the fall. The healthy color, the wealth of blooms, the ease with which I can now raise and winter many otherwise hard to raise plants, all attest to this method. I usually start mixing and stirring this "de-luxe" dinner into the soil in March, even though the plants are still in my greenhouse. The first rains of the spring will soon start leaching the contents to the roots and your plants should respond shortly.

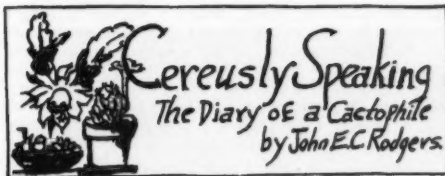
Now what about Succulents? Also Epiphyllums? Although this last group belongs to the Cactus family. My succulent and Epiphyllum collections are usually summered on benches

under our small orchard. The soil in these pots is leached out very rapidly and the mineral content must be replaced. I find the same mixture and the same amount used is OK for my succulents as well as my cacti, with one exception. In most of the varieties of cacti I use agricultural limerock in the soil, but I do not use it in the potting soil of my Epiphyllums and succulents, and I do use more humus with the latter. Some of my Epiphyllums have stems six feet long and the blooms truly rival the orchid.

The sheep manure furnishes nitrogen, the Fertilife is very quick acting. Bone meal is slow acting and will stay in the soil for some time. The powdered Phosphate is fairly quick and will last in the soil for a couple seasons. These all furnish humus, phosphorus, in fact they seem to supply all the essential needs of the cactus and the succulents, and that is all that is necessary. Do I stir this mixture in every year? No, only when needed, maybe every two years, maybe three. Depends on the amount of rainfall, on how rapidly it is leached out, also how soon the plants use up the remainder. Anyway here is good luck to you, and I hope this article will prove a big help to you in the raising of your plants.

AZTEKIUM RITTERI Boed. This new genus, established by Friedrich Boedeker in 1929, has so far included one species only, which was found by Friedrich Ritter in the State of Nuevo León, Mexico, in vertical, slaty rock walls. Its discovery, which followed that of a series of other tiny species or ones hard to find, such as *Thelocactus subterraneus*, *Strombocactus pseudomacrobale*, *S. macrobele* and *S. lophophoroides*, *Pelecyphora pseudopectinata*, etc., shows how thoroughly Mexico has been hunted through the late years and what still remains to be found by intensive search in the cactus regions. In this genus the appearance of the plant (*Aztekium ritteri* Boed.) is especially interesting and may be described as "shrivelled": the 9-11 ribs are closely forked, as if pleated, and between the ribs in the grooves are extra ribs, pleated but without areoles, whilst the areoles on the main ribs are so close that they form a continuous band of felt. It is noteworthy that spines or spine-like processes are found only on the youngest areoles and are only 3-4 mm. long and quite soft. The plants tend to make offsets from old areoles and grow slowly, but when grafted soon make beautiful, free-flowering specimens. To be sure, the unusual grey-green, shrunken, grotesque appearance then disappears, appearance to which the name *Aztekium* refers, being very happily chosen on account of its appropriateness. When we read (according to Ehrenberg, 1846) that the Aztec name for *Cereus* is *Quauhenexplacuililapilli*, and for *Phyllocactus* [= *Epiphyllum*] *ackermanni* is *Nopolotschcuezaltiquizi*, queer, composite words, then the name *Aztekium* for the above plant is especially appropriate and sound. The fruit is flask-shaped; it is not visible, however, but remains hidden in the wool in the crown, and contains minute seeds.—Curt Backeberg, *Blätter für Kakteenforschung* 1935: 9, Gen. 122. 1935.

EDITOR'S NOTE: For an illustration of this interesting plant, see Marshall and Bock, *Cactaceae*, pg. 141.



My proselyting for converts to the cactus clan among the teen-agers is at last bearing fruit. I have six young fellows from 15 to 18 who are really enthusiastic about cacti and the other succulents or just one or the other only. I've always given cuttings to boys and girls in my classes. Although some are never heard of again, a few do get the "vision" and become interested in collecting.

The cuttings are not rare, in fact, I advise anyone who becomes interested to start out with the cheapest ones and learn from them the needs of the Xerophytes. The cuttings I start most of my students with are: *Crassula arborescens*, *C. lycopodioides*, *C. portulaca*, *C. perfoliosa*, *C. perforata*, *Stapelia variegata*, *S. grandiflora*, *Huernia schneideriana*, *Haworthia margaritifera*, *H. coarctata*, *H. cymbiformis*, *Aloe arborescens*, *A. variegata*, *Echeveria weinbergii*, *E. linguifolia*, *Opuntias*, *Mammillarias*, *Cerei* (columnar types), and a few more that can be varied according to taste. A box full of cuttings disappear rapidly since most of my students come from first and second generation foreign families. Plants are treasured. Recently a boy of one of the "first generation cutting gifts" students brought me a pot of *Stapelia variegata* which had been grown from a cutting back in 1930's. Cast your bread upon the waters came true.

Robert Kenyon, the oldest of the sextet, has subscribed to the Cactus Journal and follows the cactophiles in the USA and abroad as well. He has received plants from Johnson and is now on the Johnson Cactus Garden mailing list. Bob is a *Rhipsalis* fan. He has worked for me and accepted cuttings of most of my collection for wages. He uses a terrarium to root cuttings. He fails once in a while but he is so determined that he gets another cutting and starts again. He started a greenhouse last fall but was unable to get cement blocks. He will have a fine collection for it next fall. He plans to take up Agronomy at Ohio State University beginning in September.

Robert Newlands has no preferences as yet but it looks like cacti in general and he uses other succulents to trade for cacti. No plant is too rare or expensive for him. He earns his money working on a farm. Bob Kenyon and I are working to get him interested in Agronomy.

Walter Meyers collects only succulents. He began with the *Opuntia* Clan and he had enough of spines. He likes the fleshy leaved types of succulents such as *Echeverias*, *Haworthias*, and *Stapelias*.

Peter Kratt collects cacti and other succulents. He has become interested in grafting cacti. He gave a paper before the Midwest Cactus and Succulent Club on "Grafting Cacti" in which he used cardboard figures to represent the steps.

Donald Shaver has asked for the job that Bob Kenyon holds at present so that he can get cuttings in exchange for his work in and about my cactus garden and greenhouse. He likes both cacti and succulents.

Three or four of us sit around the kitchen table and pour over books, pamphlets, catalogs, and my other data such as newspaper clippings, pictures, etc. We study and talk plants, go out to the greenhouse to look over the specimens, and come back. It takes time

to develop a cactophile but I think it is worth it.

One of the things that I have found that discourages the young collector is the superior attitude that some cactophiles use when an eager beginner talks about some of his plants. He "frosts" the beginner's enthusiasm with some such thoughtless remarks as, "I've had that for 20 years or so, it's common." Or, "I wouldn't care for a cutting, I threw mine out (or gave it away)." No, I never refuse a cutting no matter how many I have of them. What is common to one is rare to another. It is not just young beginners I've seen discouraged but oldsters too, by superior attitudes.

We should remember the first rule of a collector is there is no such thing as a "new or old plant". If it is a well grown, healthy specimen, use praise; if it's sick, offer a cure; if it's rare, offer a suitable trade or price for a cutting, and so on, but don't belittle.

I seldom lose a plant but when I do I'm always interested to find out what caused its death. My sick bay is small for the last few years. It may be I'm not sure when a plant is sick and if that is so, I'm doing pretty well. Of course, I do experiment to see what can be done with gifts of sick plants. Often a change of soil will do the trick or the knocking out and reusing the same soil is also successful. Too much lime or not enough lime, too much sand or not enough loam or leaf mold, etc., may be causes of sick plants. Poor air circulation is also a cause while not enough water can be troublesome.

Some of the literature I read warned me of "orange-spot". I've consulted collectors most of the places I've been and they have never seen it either. The books I first read were written by Californians so it may be only a disease on the West Coast. Black rot appears once in a while in some of my southwesterners but so far it has never completely destroyed one of my plants. Perhaps we, here in the Great Lakes region, are protected by our location. We do have to use iodized salt to protect us humans, perhaps our soils have something that either has been leached out or nullifies the results you get.

Remember we need young collectors. Cultivate those you know. They need advice and encouragement. I began late (28 years old) when it was a relaxing hobby and few plants were available. I learned the easy way; they must learn the hard way.

JOHN E. C. RODGERS
1229 8th St., Lorain, Ohio

SPOTLIGHT ON ROUND ROBINS

A few more members have been added to our Robins since the last report. We welcome Mrs. Norma Lee Cole, San Bernardino, California; Mrs. D. A. O'Callaghan, Newdigate, Surrey, England; Miss Marybelle A. Blehm, Oregon; Mrs. Dallas Bierman, Chesterland, Ohio; Mr. B. H. Doctor, Hammond, Indiana.

Cactus and Succulent Robin No. 6, under the directorship of Mrs. Billie Marie Anderson, has revised its membership, and could use another member. Incidentally, one of its newer members Mrs. Glen N. Anderson of Pennsylvania is most successful with flowering cacti. Someone who isn't doing as well perhaps might get some practical information from this little lady.

A request for several new members has come from Mrs. H. L. Schaefer of West Virginia who directs The Desert Dish Garden Robin. Whether you like to make arrangements of cacti and succulents, button gardens, or terrariums, or just grow cacti and succulents, I am sure you would be made cordially welcome.

The Decorator's Robin, of which I spoke in the last report, has as its director Mrs. R. S. Cowan, Pennsylvania. She sent me the information on it, which I

pass on to those of you who are interested. It will include window treatment, terrace or/and porch arrangements of cacti and succulents; how to grow Epiphyllums attractively; Vines, as Hoyas etc.; what plants make good specimens for accent; how to dramatize your living room, and other subjects relating to plants used in decorating. Please let me know if you find such a Robin interesting and you would like to belong to it. I shall be glad to put you on the list.

The International Cactus and Succulent Robin No. 2 has as its new director Mrs. Norma Greenhill, of Bridgeport, Connecticut, who with her eagerness to make this an especially fine Robin ought to bring about excellent results. Best wishes, and good flying to the Robin.

From the letters of this particular Robin I have taken some excerpts which, now that I see them side by side, seem to run all the way from a few treasured flowers here in the northeastern U. S. to the lavish displays of bloom in Australia. Perhaps some of you who are struggling with minor successes may find enjoyment and inspiration reading of the good fortune of others.

Norma Greenhill says that while she has a number of cacti that the only one she has which blooms is the Christmas Cactus. On the other hand these remarks come from Larry Gallant, "My favorite plant is *Homalocephala texensis*. I have a thirty-year-old specimen from the Arizona desert, which has about the most beautiful flowers I have ever seen (or smelled) every other March. My rarest plant is a striking two-headed *Cephalocereus senilis* that I imported from Mexico. The only plants that flower regularly for me are *Astrophytum capricorne*, *Chamaecereus silvestrii*, and the *Gymnocalycium*, *Rebutias*, and *Notocactus*. I attribute this to the inability of the plants to readily adapt themselves to the new solar conditions when they are shipped from the grower. I wish there were some way that the dealer could designate which side of the plant faced the sun. I am sure they would flower much sooner." From Anne Crompton-Smith, who lives in New Zealand, there were pictures of the clothes she uses to house her cacti, as well as some of her flowering plants handsomely ringed in bloom. Alice Evans, now living in England, is a retired school teacher once of Victoria, British Columbia. She adds, "I never dreamed that when I was walking over the prairie and chafing at the cactus spines which we were continually taking out of our shoes, that some day I should be

crackers about the things. When I finished teaching I started collecting in real earnest. I had no greenhouse so all my plants were on the window sills... so my husband built me a nice little greenhouse by the dining room window... Later on we visited various nurseries and of course gathered more samples. Then we put up a bigger greenhouse at the end of the garage which gets every ray of sunshine. I now have about 400 cacti and succulents." Writing from South Australia, Bernice Curnow has the ideal climate for cacti to really thrive. "Nearly a hundred degrees some days," she says, "and we might complain but the plants aren't. They are really growing well and have given us a wonderful lot of flowers. Offsets are everywhere. The sheen of flowers is just like satin and must be seen to be believed. It's really noticeable on *Notocactus* and *Astrophytums*. These have given us such a lot of flowers and more buds to open yet. Two *Lobivias* (*pentlandii* and *hertrichiana*) have had over thirty blooms each with other *Lobivias* not far behind. The *Echinopsis* gave their usual gorgeous show of flowers. *Parodia aurispina* had seven out at once. *Chamaecereus silvestrii* had an average of six flowers out and looked wonderful. Many *Mammillarias*; *Heliocereus speciosus*, three blooms; *Hamatocactus setispinus* keeps flowering; *Notocactus*; *Oreocereus*, *Rebutia senilis* about seventeen flowers; *Selenicereus*; and not forgetting *Lophophora williamsii* which has just finished its ninth flower and another one pushing through. I don't give it any special treatment. In fact it is left out all year with the rest even in winter; all I have ever seen here flower quite well. Saw a clump of them not so long ago and it must have had at least thirty offsets, with most of them in flower." Bernice mentioned many more cacti in flower for her which I could not put in, but it gives an idea what she has for plants and the results she gets.

In closing let me say that anyone who is a member of our Cactus and Succulent Society is eligible to join these Robins. If you are not yet a member of the Society let me extend a cordial invitation to join it, and when you do so, if you would like to be in a Robin, please write me. I hope to be hearing from many of you, whether far or near and in whatever part of the world.

MRS. GLADYS H. PANIS
P. O. Box 705
Falmouth, Mass.

MOVEMENTS IN CACTI

By DR. DONALD A. JOHANSEN

The fact that many species of *Opuntia*, as well as *Carnegiea gigantea*, exhibit a change of position, known to plant physiologists as autonomic movement, has been noted by several observant people. The writer recently engaged in a discussion of this interesting phenomenon and promised to ascertain what had been done on this biological problem and to report the results in the Journal. The information gathered on the prowl through the literature is presented herewith.

Long ago, the botanists at the Desert Laboratory of the Carnegie Institution observed, more or less casually, that the various positions assumed by the joints of *Opuntia versicolor* were related to the degree of turgidity of the plant

tissues. In one set of observations, "the downward movement took place gradually, occupying weeks or months, while the upward movement was rapid after rain or irrigation and occupied only a few days." Other sets of observations, some being made on potted plants, brought out the same result, namely, that the positions change with the amount of water in the soil, "a low position being assumed during progressive desiccation and a higher one after subsequent rain or irrigation."

"When the plants are in dry soil their tissues are shrunken and have distinct ridges and furrows around the tubercles. After rain or irrigation, as well as before any desiccation has occur-



FIG. 79
Opuntia versicolor

red, the joints are plump and have many signs of being more turgid than when in the desiccated condition."

If soil conditions remain pretty constant and observations are made at the same time each day, no perceivable change of position takes place. It was found, however, that if measurements were made frequently, "another phenomenon appears which may be said to be superimposed upon the nearly constant position in soil of unchanging water-content, as well as upon the general downward or upward motion in soil of decreasing or increasing water content." This new movement occurs within each 24-hour period and may briefly be described as consisting of a downward movement at night and an upward one during the day. There are, as might be expected, certain exceptions to this general rule, but we need not concern ourselves with them. It was determined experimentally that the short-period movements were controlled by temperature, light, the water content of the soil and of the plant tissues and possibly by the evaporative power of the air. The influence of these factors is indirect and acts through other intermediate processes.

We are all familiar with the fact that, in non-succulent plants, the plant during the day loses

more water by transpiration than it absorbs from the soil, hence it is of the greatest interest to read of the conclusive demonstrations made by one investigator that *Opuntia versicolor* is "less turgid in the daytime as is shown by the fact that the plant absorbs more water through its roots in the daytime than it loses by transpiration, and at night loses more than it absorbs." From this fact we might obtain a practical suggestion: water your *Opuntias* in the morning rather than in the evening!

How and why do the joints of some platy-opuntias acquire such awkward positions in nature? The following excerpt provides an answer: "Frequently joints continue the growth of their vascular tissue while they are in the low position and when rains come they are too stiff to return to their former erect positions. Thus the curious final forms of the cacti are determined by the amount of drought the plants experience during the last stages of secondary thickening of the joints and not by any peculiarity of the growing points." This tells us why *Opuntias* grown and carefully nurtured in a garden from the beginning do not produce the malformations so often found in plants growing in nature.

EDITOR'S NOTE: Dr. Johansen published the above in one of the early Journals.

NAKED PLANTS

Abandonment of the usual clothing of leaves has forced many plants to adopt strange substitutes for the important task of manufacturing food.—"Natural History," 1937

By HENRICKS HODGE

Naked plants? Yes. There are many of them. A good number of our northern species, particularly the woody types—trees and shrubs—lose their foliage during the winter months . . . hence are naked. But plants that go without their clothing for the greater part of their lives—that is a different question; and yet there are a number of them—nudists of the vegetable world.

Leafless plants are familiar to botanists. In fact all of those forms generally known as the lower forms (pond scums or algae; fungi, as typified by mushrooms and toadstools) are true leafless plants, but in addition they possess neither root, stem, nor flower. The plants concerning which we are to speak are truly naked. As higher forms they are supposed to have leaves—they once had them—but in the course of evolution have reached a stage where they now lack such organs.

To be without leaves is almost as bad as for us to be without blood, for the leaf of a typical plant is the great factory—the manufacturing center where, during light hours, the food is

chemically transformed and made available as nourishment. Why then do these plants lack leaves? The answer, that they may not die, seems incongruous and yet such seems to be the case.

The great majority of true leafless plants are desert dwellers, inhabitants of regions where drought is the rule, rain the exception, and naturally then, like all desert creatures, they must conserve all available moisture. For this purpose they assume the grotesque figures and remarkable shapes which we come to expect of such plants as cacti, yuccas, aloes, and Euphorbias. A good many of them, particularly cacti, are living canteens, water barrels of the desert, and are often filled with a pulp of the consistency of watermelon rind.

To bear leaves under such conditions would counteract their Scottish thriftiness, for leaves are but a plant sprinkler outlet system which releases thousands of pounds of water daily through the multitudes of tiny pores over their surfaces—the pores known to the botanists as stomata. Little wonder then that cacti should

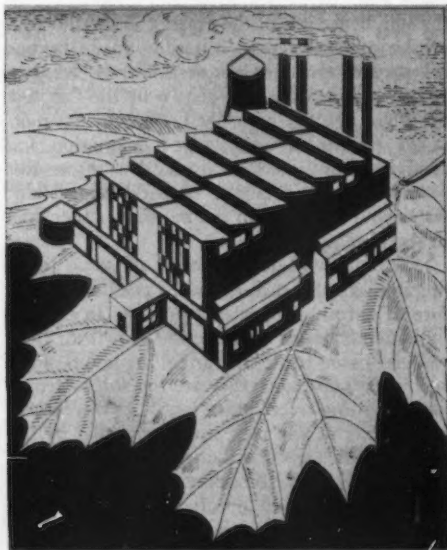


FIG. 80

The leaf is the great manufacturing center where raw materials are made available as food. For a plant to go without leaves is a difficult undertaking, yet some do—the true nudists of the vegetable world.

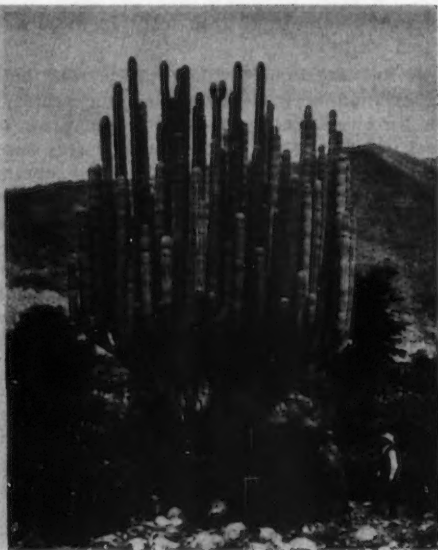


FIG. 81

Desert plants are particularly apt to go nudist, for leaves allow excessive escape of moisture. The necessity to conserve water has led to such grotesque plants as the organ-pipe cactus shown above, and the yuccas, aloes, and euphorbias.

want to abolish leaf organs. They had to do so in order to live, for theirs is a life to match the thrifty of the thrifty—at least as far as the preservation of water is concerned. And so, down through the centuries we can trace the gradual decline of leaves as an important part of the anatomy of desert-dwelling plants. Today the plants best fitted for this life beneath a scorching sun and in blistering winds have lost their leaves or carry them as vestiges of organs that are now but "has-beens"—hangovers of days gone by!

Such a loss has carried with it the threat of death, death from a starvation caused by the lack of good functioning leaves, but few plants there are that can't offset the threat. They have succeeded in a multitude of ways. Always there is compensation. The blind person often develops an unusual sense of touch; the plant also develops a replacement member. The logical plant organ to compensate for lost leaves is that organ which most often possesses the leaf's green coloring matter, and that organ is, of course, the stem.

An examination of the many curious, yet uncommon forms that have been evolved by stems to subserve the leaf function would demand years of travel through the dry woods of southern Europe; the prairies of the East Indies; the deserts of Africa, Central Asia, Australia—even

to our own western wastelands. Plant members of many varied families would show as many varied, highly evolved stem forms. The most unusual ones peculiarly enough seems to "want" to be leaves—they look like leaves but they are not leaves—they are but much camouflaged stems. to the trained botanist such stems have a definite name, *phylloclades* (pronounced fil-o-clads). Literally translated the word means "leaf branches," and they are thus named because as stems they possess the leaf function of manufacturing food.

A Doubting Thomas would say, "But how does one know that these branches of stems are stems and not leaves, for certainly they look like leaves?" In answer the botanist has a number of exacting, airtight proofs. Plant organs all differ in internal structure. In the same fashion, even though a fish and a porpoise look similar in external appearance, differences are found in their internal anatomy. Similarly, true leaves and branch leaves may appear alike superficially but a microscopic examination of their internal structure will reveal their differences. Furthermore, take a look at any leafy plant. Where do the branches arise? From the upper angles which leaf petioles or stalks meet with the main stalk of the plant. This upper angle is technically known as the leaf axil (literally—a little arm-pit), and organs which arise from axils of leaves

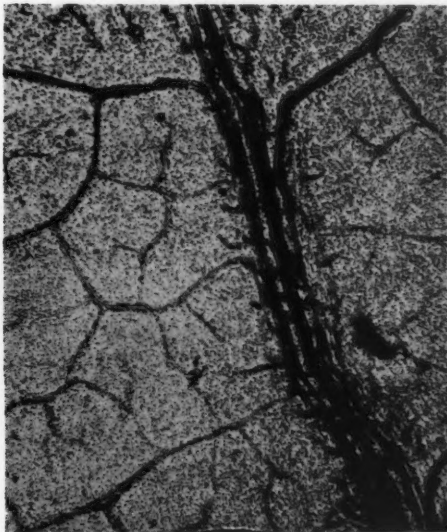


FIG. 82

A magnified view of the elaborate network of veins in a leaf which allow moisture to escape and make it difficult for leafy plants to survive in the desert. Down through the centuries leaves have gradually declined among desert plants.



FIG. 83

A tough "skin" permitting slight escape of water enables the cactus to store moisture in its pulpy interior; and many cacti are living water-barrels. Thorns protect them from the ravages of thirsty animals.

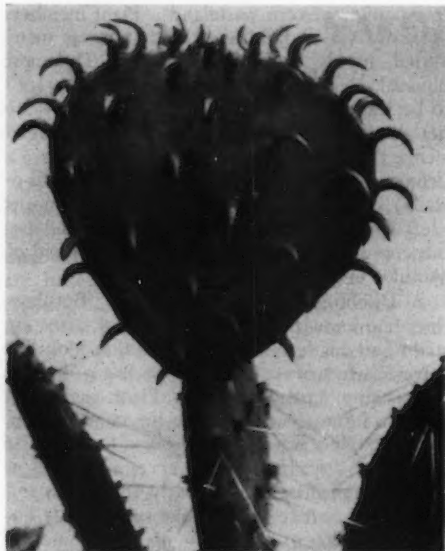


FIG. 84

Hook-shaped leaves: remnants from an age when the ancestors of our modern cacti were respectable plants and bore normal green leaves. These tiny succulent leaves of the prickly pear soon fall to the ground, to be replaced by protective spines.



FIG. 85

A cactus which has retained its leaves: the Barbados gooseberry, a living prehistoric plant. From such leaf-bearing forms all present leafless cactus must have evolved. Widely spread in tropical America, the Barbados gooseberry is used for tarts and sauces.

are always regarded as shoots or branches. Stems, then, are always found in leaf axils so there should be a leaf beneath each of our leaf-like stem organs.

Leaves of a sort we can often find, but what leaves! They are usually but tiny, emaciated, worthless (as far as food manufacture is concerned) amortizations of what a true, man-sized, efficient leaf should be. It almost seems as though the plant didn't want to give up this proof that it once bore good food-making organs—leaves which have now evolved regressively to the point of uselessness. Sometimes such leaves cling but for a short time and then fall; in other forms they persist for the life of the plant, refusing to be given up. In either case they are definite evidence of the structures they subtend—their mimics, phylloclades.

Let us look at some typical phylloclades. Perhaps most primitive—because they most resemble in their cylindrical form what they really are, namely branches—are the phylloclades of the Australian Beefwood or She-Oak, (*Casuarina stricta*). Here the fine stems are seen to droop in feathery clusters resembling the plumage of the emu-like cassowary from which this odd tree derives its scientific name. Shadeless forests, the early explorers called woodlands made up of this species, and little wonder, for sunlight filtering through such finery is little

impeded in its path to the ground. The long needle-like branches of this valuable timber tree resemble somewhat the stems of our common horsetails (*Equisetum*) and like them bear reduced scale leaves which persist throughout the life of the individual branch.

Similarly primitive and familiar to all is the mist-like foliage of the genus *Asparagus*, which upon close scrutiny will be seen to consist of multitudes of branches and sub-branches dividing *ad infinitum*. It is as though the leaves had been removed by some invisible hand, leaving the finest of skeleton frame-works—the unmodified stems "pinch-hitting" for absent leaves.

We find leaves absent in *Asparagus*, reduced but present in *Casuarina*. On African deserts, where the great succulent genus, *Euphorbia*, reigns supreme, we can find leaves which are ephemeral. Look at the snaky branches of *Euphorbia schimperi*. They bear good leaves at the tips—leaves however which soon disappear, handing over their work to the sinuous, cylindrical green stems. From the point of view of evolution, Schimper's *Euphorbia* has been caught in the active process of losing its foliage.

Our own American wastelands possess some of the best phylloclade-bearing plants—cacti. Widely spread in tropical America is the Barbados gooseberries, its fruit is made into tarts



FIG. 86

The fine stems of the Australian Beefwood or She-Oak droop in feathery clusters resembling the plumage of the cassowary from which this odd tree derives its scientific name, *Casuarina stricta*. It is valuable as a source of timber.

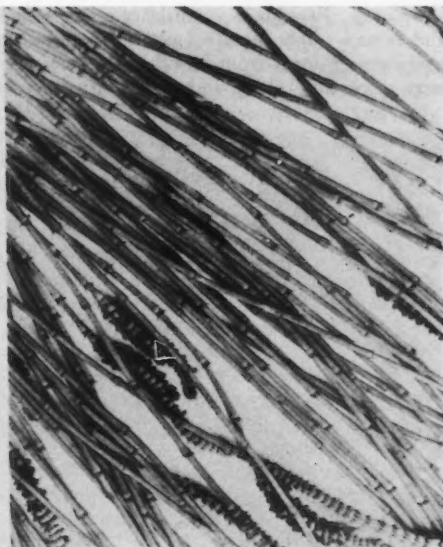


FIG. 87

(Above) The stems of our common horsetails (*Equisetum*) are somewhat similar to the long needle-like branches of the Australian Beefwood (opposite) and like them bear reduced scale leaves which persist throughout the life of the branch.



FIG. 88

When is a leaf not a leaf? When it is the broad flattened stem of the night blooming *Cereus*. Plants without leaves to serve as food factories shift this task to the stems, which contain the leaf's green coloring matter.



FIG. 89

Instead of leaves the familiar *Asparagus* plant sends out multitudes of branches and sub-branches dividing *ad infinitum*. It is as though the leaves had been removed by some invisible hand, leaving the unmodified stems to "pinch-hit" for them.

and sauces. *Pereskia* is a still-leafy cactus genus and as such might be called persistent primitive type coming down from far-off days when cacti were respectable plants and more normal green

leaves like their friends. Here we have a start in evolution—a cactus plant with leaves—and from this original condition all present leafless cacti must have evolved. Indeed leafless plants



FIG. 90

What appear to be leaves in *Phyllanthus angustifolius* are in reality flattened stems, as proved by the clusters of tiny flowers.

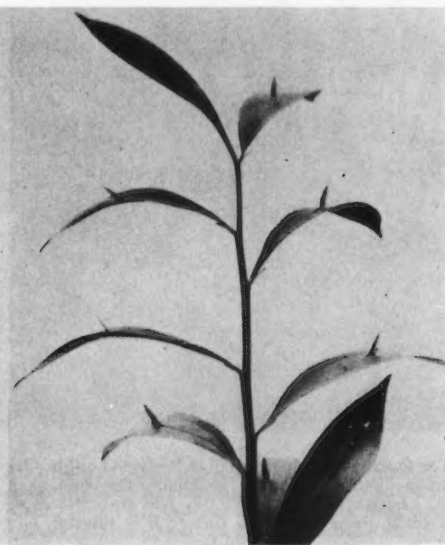


FIG. 91

A tiny flap leaf growing from each broadened stem proves that *Ruscus hypoglossum* once wore real leaves. It need not blush: it has reclothed itself.



FIG. 92

A plant caught in the process of going nudist. The snaky branches of *Euphorbia schimperi*, which serve as leaves, bear only temporary true leaves at the tips.



FIG. 93

Note that flowers grow from the surface of the broadened stems of *Ruscus aculeatus* of the lily genus, proving that they are not leaves.

of all types must have been derived from similar leafy ancestors.

Phylloclades run the whole gamut of shapes from the cylindrical upright pillars of the organ-pipe cactus to the flat streamers of the night-blooming *Cereus*. Hesitant of spending their lives without the cloaks that green leaves form, the familiar "Prickly Pear" varieties (*Opuntia*) attempt to keep modest by retaining, for at least a few months of their lives, worthless awl-shaped leaves, appearing on the new growth like so many little green hooks bending backward.

Queer stem modifications are not limited to the great cactus family. Similar to species of *Cereus* in possessing stems which are ribbon-like is the genus *Muehlenbeckia*, commonly known in the horticultural trade as "tapeworm plant." The striking worm-like resemblance of this native of the Solomon Islands is caused by the lateral flattening of the main stems, the joints or nodes marking the position of leaf or flower attachment. The flowering "leaf" of the West Indies *Phyllanthus angustifolius*, is another example. What appears at first to be a leaf is

found to be, in reality, a flattened stem bearing on it numerous clusters of tiny flowers.

Best phylloclade of all—best because it most resembles the leaf whose job it has taken over—is the stem of the lily genus, *Ruscus*. Species of this plant are frequently known as "butcher's broom" owing to their former use by members of that profession in sweeping clean their blocks. They are erect shrubs with partially woody stems; and, hardy in Southern Europe, are grown in this country in Florida and Southern California. Dried, bleached and dyed (usually red) they have become familiar to the shopper around Christmas-tide, for they are much used in florist's sprays and bouquets.

Like *Phyllanthus*, the butcher's broom bears flowers—seated, however, not on the edge of the branch but on the middle of the upper surface. But what a branch this is!—a far cry from the conservative, rounded, leaf-bearing stems of most plants. Yet in shape these stems of *Ruscus* are good leaf mimics. As such they fool even the best of us.



CACTI GROWING WITH ORCHIDS

FIG. 95. Well-established clusters of *Laelia rubescens* Ldl., growing in an abandoned farm-yard of a southern Mexico village.

An Ocean Desert

From *Taylor-Rochester* magazine

By LOIS A. SNYDER

Nature, in an ungracious mood, looked askance at a jagged sliver of land slanting away from the mainland of California and, turning miser, apportioned a meager allowance to the peninsula. As a result of this "thumbs down" procedure, the sprawling offspring of two seas, christened Baja California, has lapsed into the blighted category of an intermittent desert. It has become a region of contradictions,—a land of promise and of bitter disillusion. Its shores constitute North America's longest desert coast line and present a paradoxical combination of aridity in the midst of boundless water expanses. Situated between the Pacific Ocean and the Gulf of California which separates it from the mainland, this territory has an approximate length of 750 miles, with a narrowed width varying from 30 to 150 miles.

Centuries of history thread the peninsula with romance and mystery. Volcanic in origin, the jutting land became peopled with a race that vanished after carving mysterious hieroglyphics on its rugged sierras; this civilization was supplanted by Indian tribes who eventually came in contact with mightier warriors under the Spanish leadership of Cortez, Mendoza and others during the early 16th century, when the country was known to them as an island. These Conquistadors utilized the safe harbors of Lower California's cape region, and beginning in 1570 Spanish galleons negotiated a biannual route eastward from the Philippines, benefiting by favorable winds and currents. Later there came the padres whose influence is manifest by numerous missions; prominent in the group were the Dominican Brotherhood and the Jesuits.

Geographically, Baja California consists of four natural subdivisions, namely, the Cape Region, embracing Cape San Lucas and San Jose del Cabo sections, northward to La Paz; central Lower California and the rugged narrow "Waist," both intermediate divisions; and La Frontera which includes territory north from the "Waist" to the international boundary.

In brief summary, the tropical cape region is the most productive portion, particularly that section surrounding Todos Santos and San Jose del Cabo. Central Lower California offers extensive but barren plains containing thousands of acres of level or slightly rolling land. The "Waist" section is practically devoid of flat land with the exception of plateaus having a lava floor. La Frontera is not unlike Mexican Sonora and southern California, with level land promising fertility by reclamation only. From the American boundary to the extreme southern tip, the peninsula is pierced by a serrated crest of granite sierras, sloping off to the west and breaking away eastward in abrupt cliffs that reach a height of 7,300 feet. Combined with the principal range are smaller mountains, hills, volcanic mesas and rough outwash slopes.

Entire Baja California is subjected to sporadic rainfall which may occur during each season, but, more frequently, does not appear at all for several years. There are two sources of moisture and two periods for its distribution. During summer months, the eastern or Gulf Coast receives tropical rains which originate in the Gulf of California and precipitate on the cooler eastern sierras. Another source of moisture is a minor portion of Alaskan rains which provide an irregular and unreliable supply during winter months on the Pacific Coast.

Only on a few mountains is the annual rainfall more than five inches, even this amount being merely the average of many rainless years interspersed by a torrential shower which is characteristic of this region. Sporadic rains of this type usually occur in a limited area and afford little opportunity of absorption by the glistening white soil, with adjacent land remaining parched and dry. Adequate showers transform the entire country from a barren waste to a paradise. The land is suddenly bedecked with a profusion of flowers and greenery, closely rivalled by various shrubs and trees exhibiting a verdant crop of foliage. However, this new growth is destined to perish with the resumption of excessive drought and the landscape once more assumes its appearance of having been modeled from plastic white clay. The occasional traveler is reminded of lines from William Morris which read, "Nought but images, lifelike but lifeless, wonderful but dead."

Distinctly peculiar to Lower California are the water-holes or "tinajas" which are natural cisterns formed in the rocky floors of arroyos and allowing

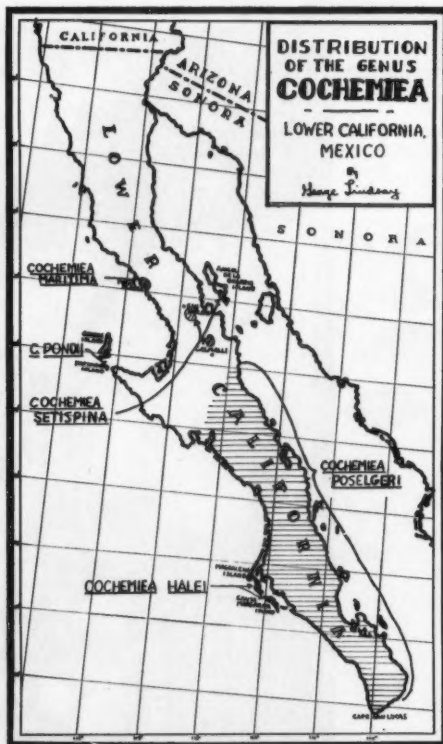


FIG. 96. A map of Lower California Mexico drawn by George Lindsay to show the distribution of one of the many cacti growing there.

collection of rain. Many of these are huge in capacity and furnish a welcome water supply to the thirsty traveler, while others abound with small fish and terrapin.

The atmosphere of Lower California is dry and healthful, being unusually clear except on the fog-swept western coast. But uncertain rainfall, meager sources of water and the relatively small amount of arable ground, have united to form a sparsely settled territory.

Owing to its aridity and isolation, Baja California has developed many distinctive species of plants and vegetation. With a view to further study of this striking growth, the Desert Laboratory of the Carnegie Institution of Washington sought information regarding plant behavior on the arid peninsula, together with an opportunity for comparison of desert conditions on the detached portion with those far inland at the Laboratory. Accordingly from headquarters in the Sonoran Desert which involves Arizona and Mexico, an expedition into Baja California was led in 1935 by the late Dr. Forrest Shreve, then in charge of the Laboratory and Dr. T. D. Mallory, investigator at that place. Leaving Tijuana they proceeded by automobile to the tip of the peninsula at Cape San Lucas, a driving distance of 1,168 miles. Unusually heavy rains contributed numerous difficulties to the traveling comfort of the party but its members were rewarded with a lavish abundance of blossoms, foliage and short-lived annuals, brought forth by the unwonted moisture of twelve years' absence.

During the course of their journey, the peninsula was crossed six times, permitting ample observance of differences between the two coasts in northern and southern boundaries. Plant reaction to fog during rainless summers, and other humidity problems were noted, along with a study of proximity to the ocean and its effect upon plant life. On the east side of the cape, trees and shrubs grew lower and more widely spaced, with cacti flourishing in abundance. This region is on the border between the desert country and a dry thorn-forest extending south along the coast of the mainland.

A majority of the unusual plant types which characterize the landscape of Baja California are either found in no other locality or they occur rarely in Sonora. Among noteworthy examples of uncommon varieties are the cirio, the torote, giant yucca, large century plant, huge cactus, the ocotillo and the "creeping devil."

Most of these species have developed a singular initiative in their struggle to defeat difficult forces of their environment, with resultant internal and external adaptations for equalizing moisture content. Outstanding in the group is the Cirio* which is limited to the Sonoran Desert and adjacent regions. This unusual plant flourishes in Central Baja California and in favorable places attains a height of 50 feet or more to form veritable forests. Viewed from a distance the great Cirio colonies resemble a burned forest in the northern Rockies, owing to their peculiar formation. Quoting from Dr. Shreve's description, "Slender thorny branches grow horizontally from the trunk in young trees but the tall ones are usually naked. There is a single tapering trunk which occasionally divides into two or more branches. These grow upright and close together as if there were no room for them to separate. Leaves are borne on the lateral branches or in tufts on the trunk, and remain as long as the soil is moist." The Cirio is indeed a "camel-plant" since its internal system provides an amazing water storage arrangement. In the trunk there is an outer woody cylinder enclosing a large central core of pith with a very light form of vascular tissue. During rainy sea-

sons the pithy cells are saturated with water but after a year or more of drought, they become air spaces.

The Cirio and three species of Ocotillo that are native to the region produce foliage only at favorable seasons and, unlike many desert plants, their leaves are not highly specialized to reduce water evaporation. However, transformation from moist country to desert types is accomplished through loss of the leaves. In the case of the Ocotillo, internal adjustment to water content is made by means of horny layers of tissue deposited just beneath its bark which prevent drying out. This type may produce as many as eight crops of leaves in a single year, depending on the number of rainy periods. (See pg. 86, May-June).

A question has arisen as to whether the few species of Cirio and Ocotillo are representatives of a family evolved long ago and now approaching extinction, or mere forerunners of a line to be developed in great variation of form and range.

In direct contrast to the group described which have originated internal adaptation to drought conditions are the giant cacti with an external system for dry weather resistance. These great plants possess accordion-pleated trunks capable of adjusting their size to the amount of water they contain.

Groups of certain fat-stemmed trees lend a fantastic appearance to the landscape of Baja California. Chief among this variety is the Torote, a low and vigorous shrub, closely related to the sumac. Unusual characteristics of the shrub are its enormous trunk and almost equally thick branches which execute contortions of snake-like tendency. Spreading over the ground like a low forest, these branches remain close to the soil, coming to rest on the earth ten or more feet from the stem, a position attributed to strong winds and other adverse conditions. A thick bark encloses the soft interior which renders the shrub valueless as fuel even in a country scantily supplied with firewood.

Fortunately the 1935 expedition obtained young seedling trees of the Torote and other fat-stemmed forms which were returned to the Laboratory for observation as to habits of growth and development.

Bajan vegetation offers much in the way of facts and conjecture, with each specimen supplying significant interest as to its historical origin and inevitable efforts toward successful adaptation to desert environment. Whether they are pioneers of a newly developed race or the last in a long line nearing extinction, these true Spartans doubtless may echo the words of Walter Landor's "Hellenics," "We are what suns and winds and waters make us."

NOTICE TO AFFILIATES

The Cactus and Succulent Society of America, Inc., is happy to announce that we have a new set of slides to offer you for program material. Do not let the title confuse you. Except for only a few, these slides have never before been included in any of the slide sets. The slide sets available now are as follows:

- Set No. 1—Cactus and other succulents Native to California (new set).
- Set No. 2—Baja California, Mexico and So. America.
- Set No. 3—Orchid Cacti and Miscellaneous Succulents and Cactus.
- Set No. 4—Orchid Cactus—Donated by S. E. Beahm of Beahm Epiphyllum Gardens.

Slides will be loaned upon my receipt of a \$5.00 deposit which will be returned after the return of the slides to me.

MRS. MARY GLADE, Corresponding Secretary
7600 Verdugo Crestline Dr.
Tujunga, California.

**Idria columnaris*



FIG. 97. An arrangement of succulents in the garden of Warren W. Tremaine in Montecito, California. Ralph T. Stevens of Santa Barbara designed this unusually beautiful garden with its mass plantings of a large variety of succulents. Echeverias, Kleinias, Cotyledons and Dudleyas are used with emphasis on color patterns.



FIG. 98. A view from the same garden showing the use of rocks with dominant plants of Aloes and Dudleyas. Tree Aloes and Kalanchoes were used for contrast effects.
See *Horticulture* cover July 1955.



SPINE CHATS

LADISLAUS CUTAK



The noted Aloe authority, G. W. Reynolds, made a 4,000-mile trip through Madagascar in June and July of 1955 and as a result secured much herbarium material as well as a large number of black and white and color photographs of his favorite plants. At a later date, Mr. Reynolds will attempt an illustrated review of the Aloes of Madagascar, which ought to be a worthwhile project. On this Madagascan expedition two new species and two new varieties were studied and their descriptions published in the January 1956 Journal of South African Botany.

Aloe millotii is said to be a very distinctive species with a rather sprawling habit of growth, and could hardly be confused with any other species. It is a small low, much branched undershrub with spirally twisted to rosulate leaves and few-flowered racemes bearing scarlet blossoms. The plant was found only on limestone, in exposed or in partial shade, under intensely arid conditions. The natives are said to make a decoction from the leaves and drink it for stomach troubles. The other new species, *Aloe iremensis*, occurs as a solitary plant never forming groups. It has little or no stem, and is characterized by its very small marginal teeth, slender tall inflorescence, and by its very narrowly deltoid bracts. The two new varieties are *Aloe bulbilifera* var. *paulianae* from Majunga Province and *A. acutissima* var. *antanimorenensis* from Tuléar Province. The first variety is distinguished from its type by the stouter, erect, rigid peduncles and by the considerably shorter and much more compact branches. It also forms bulbils on the peduncle and not on the branches as in the type. The second variety differs from typical *A. acutissima* in having much shorter stems and shorter leaves. A noteworthy character of the variety is that the inflorescence is as tall as the stem and rosette combined, sometimes taller.

In the same issue, G. W. Reynolds describes a new aloe from Kenya Colony, which he named *Aloe ukambensis*. It is related to *A. abyssinica*. It is an acaulescent plant which forms small to large dense groups on gneiss outcrops. A striking character of *A. ukambensis* is the leaf lineation, and the arrangement of the "H"-shaped spots. These "H" spots are almost square and occur only in line with, and interrupting the veins. The capitate racemes are usually only a little higher than the leaves, while in the flowers, the filaments and style lie along the lowest side of the perianth.

The January 1956 issue of The American Midland Naturalist contains a paper by Dr. Margery Anthony on "The Opuntiae of the Big Bend Region of Texas." This paper discusses the significant features of the 31 species, hybrids and varieties of *Opuntia*. Four new varieties, three new hybrids and one new species are described. *Opuntia spinosibacca* becomes the only known species endemic of the Big Bend Region *Opuntias* and its most striking features are the markedly ascending branches, protuberances elevating each areole on the joint, and the very distinctive spiny fruits. The four new varieties exhibit markedly distinctive characters: *O. imbricata argentea* is lower in stature than the type, has smaller tubercles making the areoles appear closer together and spines are silvery through-

out. *O. lindheimeri chisosensis* produces compact bushes with fruit relatively small and globose unlike the large pyriform of the type. *O. macrocentra minor* produces rufous spines unlike those of the type, and *O. rufida tortiflora* has shorter obovate joints than the type and its flower sepals swirl in imbrication and twist sideways in anthesis. The three hybrids described are *O. kleiniae* x *O. leptocaulis*, *O. grahamii* x *O. schottii*, and *O. engelmannii* x *O. phaeacantha*.

John L. Spencer undertook a study of the Puerto Rican cactus family which roughly encompasses 25 diverse species represented in 13 genera chiefly for the cytological data and also to determine whether differences in gross morphology are correlated in any way with evolution of the karyotype. Only wild forms were collected and their chromosome numbers were determined from root tip mitoses. The results of his cytological survey were published in the September 1955 issue of Botanical Gazette (pages 33-37).

This year I had the opportunity to visit New Orleans during its Spring Fiesta in April. This annual two-week event had its inception in 1937 and ever since has drawn thousands of tourists from all parts of the United States as well as many foreign countries. The Spring Fiesta emphasizes the cultural and colorful phases of old Louisiana as well as creates interest in the progress of the modern Creole State. Picturesque courtyards, occupied by restaurants and gift shops, as well as private homes and clubrooms are opened to the public and in many instances costumed hostesses are on hand to greet you. I found much charm in the lovely patios of the French Quarter. Now and then, a few succulents were noticed in some of them, but on the whole these are not cultivated extensively. Occasionally, I saw strawberry jars and plant boxes filled with Hen-and-Chicks or their close allies, *Graptopetalums*. The Burro's Tail, *Sedum morganianum*, was another favorite used in hanging pots. *Yucca aloifolia* was another favorite, as were a few *Euphorbias*. Morris Henry Hobbs, whose etchings hang in many homes throughout the land, has a studio on Toulouse and his front porch is crowded with all kinds of bromeliads. He invited me to spend the week-end with him in Mandeville, on the north shore of Lake Pontchartrain, where he keeps his larger collection. In town, the Hobbs reside in the Pontalba Apartments on St. Peter Street side of Jackson Square. These apartments are believed to be the first apartment houses in the United States. From his porch in the Pontalba I had a ringside view of the festivities which were being filmed by Columbia Cinema-Scope for a movie. Linda Laurent extended an invitation to visit her home on Chartres Street. It was there that I received my first glimpses of typical patios of the French Quarter. With Linda Laurent and Bessie Alcus as my guides, we entered many patios and when I had my fill they whisked me to the more modern gardens in the uptown districts. Mrs. Alcus is an inveterate bromel fan and her husband built for her a large bay window in the dining room where she exhibits a large collection of rare bromels on glass shelves. I am also

greatly indebted to the Eric Knoblochs of Dalcour, where I spent a few days studying and photographing their plants. To Eric belongs credit for starting many folks in the bromel hobby. He certainly has built up an enviable collection at his place. Mrs. Knobloch cultivates a few cacti around the home. *Yucca gloriosa* was in full bloom and a Century Plant was sending up a huge spike.

THE "BLACK GASTERIA"

FIG. 99. Lower left: Plant in flower. FIG. 100. Lower right: Plant shown one-half natural size. FIG. 101. Right: Flower shown natural size. Who knows the source of this strange plant that seems all mixed up? Some of the leaves are three-angled and sharply pointed, others are flattened as in most of the Gasterias. New growth sometimes shows flecked markings, otherwise the leaves are a deep greenish black. The root system is vigorous yet the plant grows slowly but is easily propagated from divisions.



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